

What is claimed is:

1. A digital communication device, comprising:

a decoder which calculates likelihoods indicative of probability in which a signal received from another communication device corresponds to a plurality of signal sequences;

a relative likelihood calculator which calculates a relative likelihood expressing differences and ratios between the most probable likelihood among the calculated likelihoods and the other likelihoods; and

a transmission parameter deciding unit which decides a transmission parameter composed of at least one of modulation scheme, a coding rate and a transmission power for a signal to be transmitted at next time, based on the calculated relative likelihood.

2. The digital communication device according to claim 1, wherein said transmission parameter deciding unit calculates the relative likelihood expressing a difference and a ratio between the most probable likelihood and at least one of an average value, a maximum value and a minimum value of the other likelihoods.

3. The digital communication device according to claim 1, wherein said transmission parameter deciding unit includes:

a modulation scheme selector which selects the modulation scheme of the signal to be transmitted at next time based on the calculated relative likelihood;

a coding rate selector which selects the coding rate of the signal to be transmitted at next time based on the calculated relative likelihood; and

a transmission power selector which selects the transmission power of the signal to be transmitted at next time based on the calculated relative likelihood.

4. The digital communication device according to claim 3,

further comprising a memory which stores result selected by said modulation scheme selector, said coding rate selector and said transmission power selector;

wherein said modulation scheme selector, said coding selector and said transmission power selector switch the selected contents, and said memory updates the stored contents, when a prescribed time is passed, or a prescribed condition is satisfied.

5. The digital communication device according to claim 3, further comprising:

an encoder which codes a signal to be transmitted to the other communication devices based on the coding rate selected by said coding rate selector; and

a modulator which modulates a signal coded by said encoder and transmits the modulated signal with transmission power selected by said transmission power selector based on the modulation scheme selected by said modulation scheme selector.

6. The digital communication device according to claim 1, further comprising a data converter which transmits a signal to be transmitted to the other communication device which has transmitted the received signal, including the transmission parameter decided by said transmission parameter deciding unit.

7. The digital communication apparatus according to claim 1, further comprising a demodulator which demodulates the received signal transmitted from the other communication device,

wherein said decoder decides whether or not the signal demodulated by said demodulator corresponds to any of said plurality of signal sequences; and

said relative likelihood calculator calculates the relative likelihood based on a result decoded by said

decoder.

8. A digital communication apparatus, comprising:

a transmitter which transmits a signal to another communication device;

a receiver which receives data including a transmission parameter composed of at least one of modulation scheme, a coding rate and a transmission power used when said other communication devices transmit the signal at next time, said transmission parameter being decided by the other communication device based on the signal; and

a transmission parameter deciding unit which decides at least one of the modulation scheme, the coding rate and the transmission power to be transmitted to the other communication device at next time, based on the transmission parameter included in the received signal.

9. The digital communication apparatus according to claim 8, further comprising a data converter which extracts said transmission parameter from the signal received by said receiver,

wherein said transmission parameter deciding unit decides at least one of the modulation scheme, the coding rate and the transmission power of the signal to be transmitted to the other communication device at next time, based on the extracted transmission parameter.

10. A digital communication system comprising first and second communication devices which transmit and receive a signal to each other through first and second communication channels, wherein at least one of said first and second communication devices includes:

a decoder which calculates a likelihood indicative of a probability in which a signal received from another communication device corresponds to candidates of a

plurality of signal sequences, respectively;

a relative likelihood calculator which calculates a relative likelihood expressing differences and ratios between the most probable likelihood among the calculated likelihoods and other likelihoods; and

a transmission parameter deciding unit which decides a transmission parameter composed of at least one of modulation scheme, a coding rate and a transmission power of a signal to be transmitted to the other communication device at next time.

11. A digital communication system comprising first and second communication devices which transmit and receive a signal to each other through a first and second communication channel,

wherein said first communication device includes:

a first decoder which calculates likelihoods indicative of a probability in which a signal received from said second communication device through said first communication channel corresponds to candidates of a plurality of signal sequences;

a relative likelihood calculator which calculates a relative likelihood expressing differences and ratios between the most probable likelihood among the calculated likelihood and other likelihoods;

a transmission parameter deciding unit which decides a transmission parameter composed of at least one of modulation scheme, a coding ratio and a transmission power of a signal to be transmitted to a second communication device at next time, based on the calculated relative likelihood;

a first encoder which codes a signal to be transmitted to said second communication device through said second communication device; and

a first modulator which modulates the signal coded by said first encoder, based on the transmission parameter

decided by said transmission parameter deciding unit;

said second communication device includes:

a second decoder which decodes the signal received from said first communication device through said second communication channel;

a second encoder which codes a signal to be transmitted to said first communication device through said second communication channel; and

a second modulator which modulates the signal coded by said second encoder.

12. The digital communication system according to claim 11, wherein said transmission parameter deciding unit decides at least one of the modulation scheme, the coding rate and the transmission power of the signal to be transmitted at next time, by using at least one of an average value, a maximum value and a minimum value of the relative likelihood for candidates of a plurality of signal sequences.

13. The digital communication system according to claim 11, wherein said transmission parameter deciding unit includes:

a modulation scheme selector which selects the modulation scheme of the signal to be transmitted at next time, based on the calculated relative likelihood;

a coding rate selector which selects the coding rate of the signal to be transmitted at next time, based on the calculated relative likelihood; and

a transmission power selector which selects the transmission power of the signal to be transmitted at next time, based on the calculated relative likelihood.

14. The digital communication system according to claim 11, further comprising a memory which stores a result selected by said modulation scheme selector, said coding rate selector and said transmission power selector, said memory being provided in said first communication device,

wherein said modulation scheme selector, said coding rate selector and said transmission power selector switch the selections, and said memory updates the stored contents, when a prescribed time is passed, or a prescribed condition is satisfied.

15. A digital communication system composing first and second communication apparatuses which transmit and receive data to each other through first and second communication channel,

wherein said first communication apparatus includes:

a first decoder which calculates likelihoods indicative of probability in which a signal received from another communication device corresponds to candidates of a plurality of signal sequences;

a relative likelihood calculator which calculates a relative likelihood expressing differences and ratio between the most probable likelihood among the calculated likelihood and the other likelihoods;

a first transmission parameter deciding unit which decides a transmission parameter composed of at least one of modulation scheme, a coding ratio and a transmission power of a signal to be transmitted to the other communication device; and

a first transmitter which transmits data including the decided transmission parameter, through said other communication channel on the transmission parameter decided by said first transmission parameter deciding unit,

said other communication device includes:

a transmission parameter extracting unit which extracts the transmission parameter included in data transmitted from said first communication device through said second communication channel;

a second transmission parameter deciding unit which decides the transmission parameter in the case of transmitting data to said first communication device through

said first communication channel; and

a second transmitter which transmits data on the transmission parameter decided by said second transmission parameter deciding unit through said first communication channel.

16. The digital communication system according to claim 15, wherein said transmission parameter deciding unit decides at least one of the modulation scheme, the coding rate and the transmission power of the signal to be transmitted at next time, by using at least one of an average value, a maximum value and a minimum value of relative likelihoods for candidates of a plurality of signal sequences.

17. The digital communication system according to claim 15, wherein said transmission parameter deciding unit includes:

a modulation scheme selector which selects the modulation scheme of the signal to be transmitted at next time, based on the calculated relative likelihood;

a coding rate selector which selects the coding rate of the signal to be transmitted at next time, based on the calculated relative likelihood; and

a transmission power selector which selects the transmission power of the signal to be transmitted at next time, based on the calculated relative likelihood.

18. The digital communication system according to claim 17, further comprising a memory which stores results selected by said modulation scheme selector, said coding rate selector and said transmission power selector,

wherein said modulation scheme selector, said coding rate selector and said transmission power selector switch the selected contents, and said memory updates the stored contents, when a prescribed time is passed or a prescribed condition is satisfied.

19. The digital communication system according to claim 10, wherein said first and second communication channels have the same or similar transmission properties.